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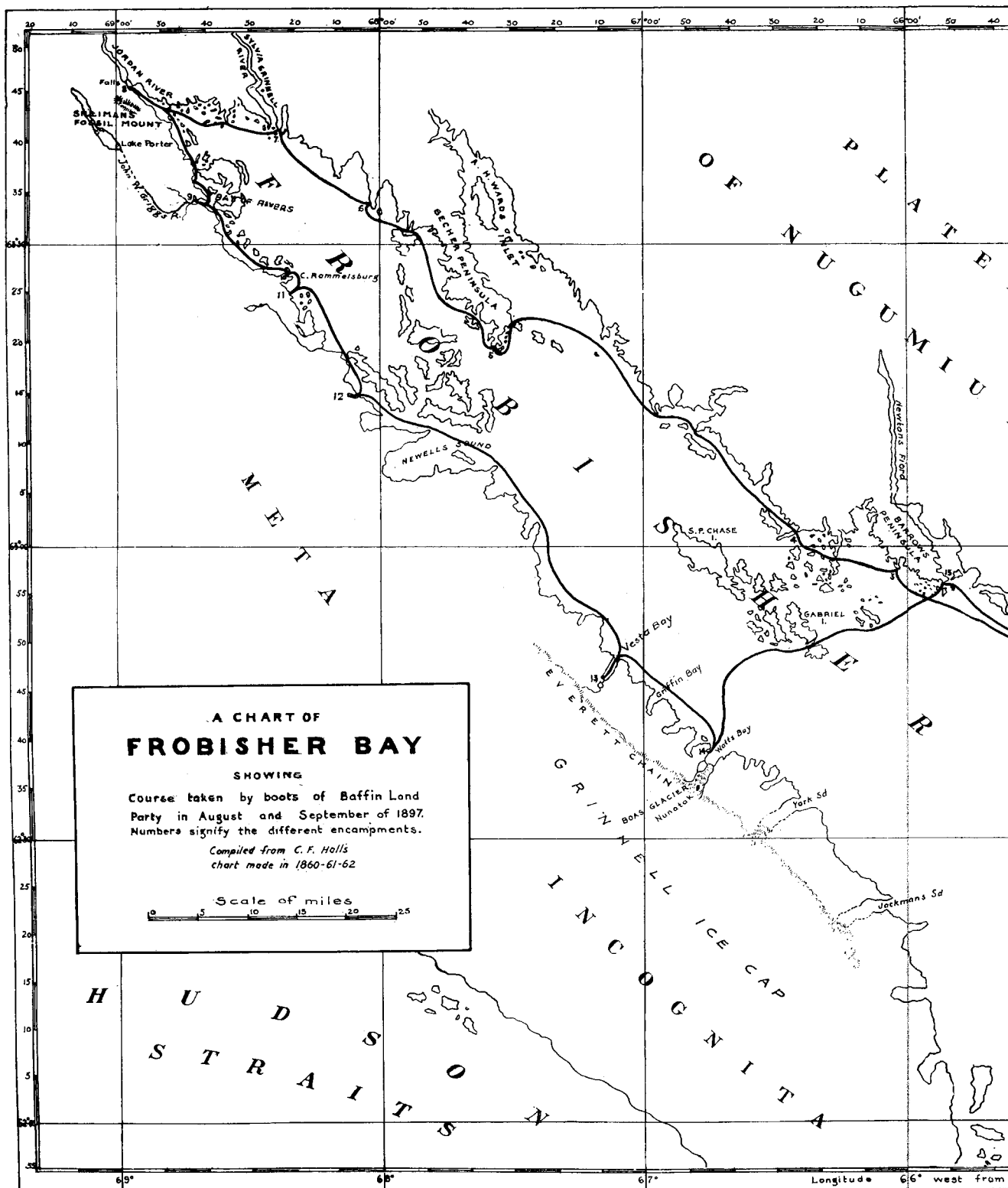
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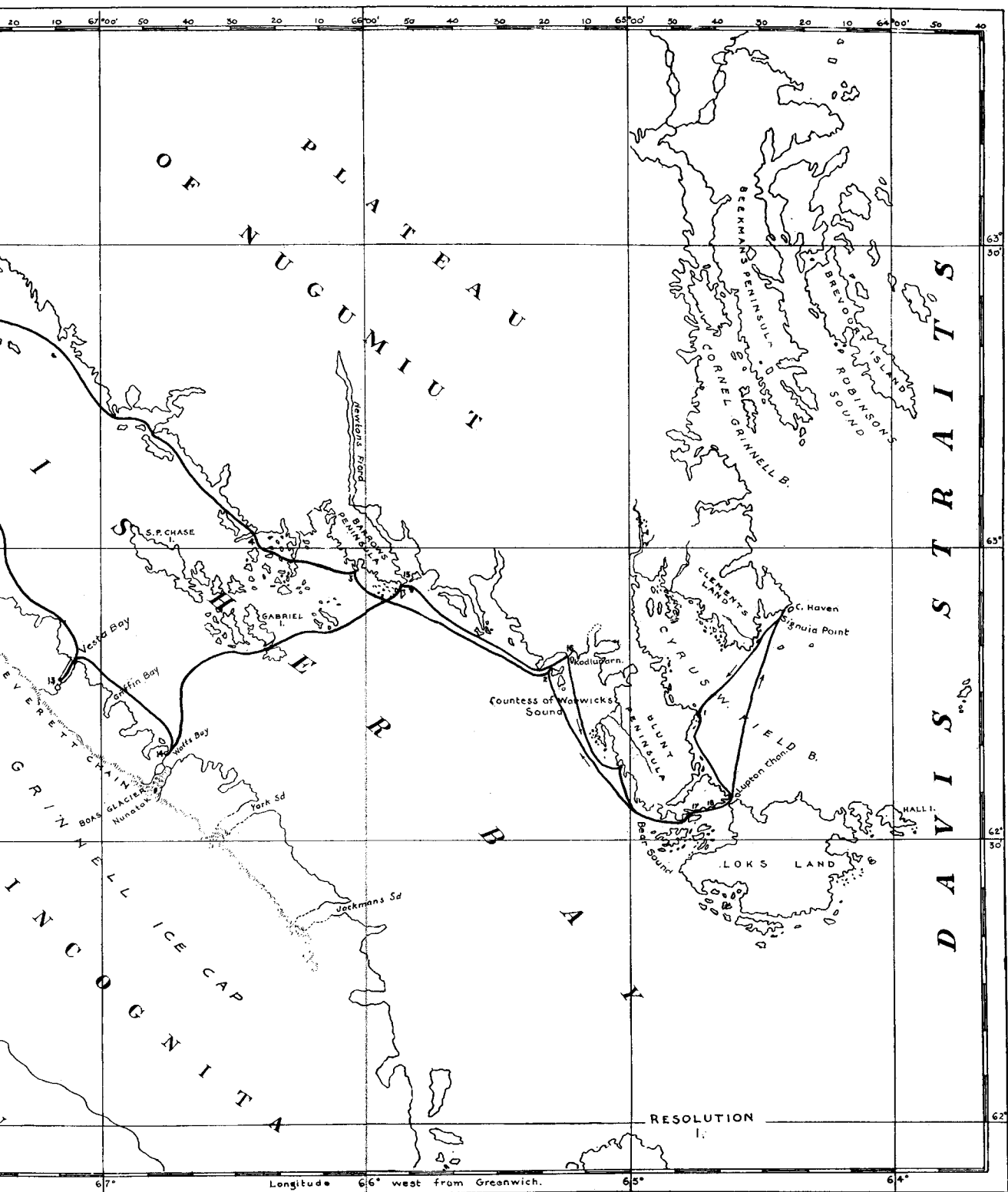
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FROBISHER BAY REVISITED.

BY

RUSSELL W. PORTER.

The doubt in the minds of geographers as to whether Frobisher Bay was a closed arm of Davis Straits or a strait opening into a larger body of water to the northwest remained unsettled from the time it was discovered by Martin Frobisher, in 1576, until thirty-seven years ago.

Thinking that the region might possibly hold some clue to the fate of Sir John Franklin's expedition, Charles F. Hall, afterwards Commander of the United States Polar Expedition, visited Baffin Land in 1860, and the next summer entered Frobisher Bay and reached its headwaters. The original object of his expedition was a failure, but his geographical work of locating some five hundred miles of shore line and innumerable islands scattered through the bay, made the trip of permanent value.

Since that time there is no record of white men having explored this bay. Whaling vessels have wintered in Davis Straits to the north of the bay, and of late years a whaling station has been established forty miles from its entrance, but the work of these men was confined to the seaboard in the interest of catching whales.

The idea of again traversing the little-known regions was conceived by the writer in the fall of 1896, on his return from Greenland, during a short stop at a Scotch whaling station in Cumberland Sound.

It was his intention to remain in southern Baffin Land with one companion through the winter, in order to reach by dog sledges the lake region of the interior, and make an extended study of the Eskimos in this vicinity for ethnological purposes.

Provisions and equipment were therefore taken for a fifteen-

months' stay, and the writer, accompanied by Alfred V. Shaw, of Newton Highlands, Mass., embarked at Boston July 19 on the steam-whaler *Hope*. *

The *Hope* coaled at New Campbellton, Cape Breton, passed through the Gulf of St. Lawrence and up the Labrador coast. She crossed the entrance to Hudson's Straits the last day of July, and early on the morning of the 1st of August the party were landed at Cape Haven on the west coast of Baffin Land in latitude 62° 54' N.

From Hall's account of his travels in this region, it is quite evident that the Eskimos were of inestimable service to him, both as guides and in taking advantage of the different conditions of weather, winds and tides, which here especially contribute an important factor in determining just how much territory can be covered in a given time. Twelve natives were therefore hired to accompany the party. The equipment consisted of two whale-boats, rigged with mainsails and jibs, sleeping bags, kerosene oil stoves, and canned provisions. In retrospect it must be admitted that the trip as carried out could not have been accomplished safely without these natives. The tides in the bay vary from twenty to thirty feet, and when setting in opposite directions, as they sometimes do among the islands, create currents which are remarkably erratic and powerful, so that a party new to these regions and alone would be apt to have their boat on the rocks before their journey had scarcely begun. The winds in the same way are to be equally unrelieved upon, as they are dependent to a great extent on the configuration of the country for their direction. They may change, as they did several times this summer, to the four points of the compass in a single day's run. The Eskimos, thoroughly familiar with these fickle elements, enable one not only to avoid danger, but to make use of them to advantage.

After a preliminary trip to the head of Cyrus W. Field's Bay the party started on August 11 for Frobisher Bay, taking a southerly course towards Bear's Sound. This sound separates a few large outlying islands marking the northern entrance of the bay from the mainland, and is full of islands. Its easterly entrance, Lupton

* In addition to the above a party of six persons, organized by the writer and composed mostly of college students, joined the expedition for the sport which a summer in this region afforded. It need only be stated here that this party spent a very satisfactory six weeks in and about the bay, there being an abundance of game, including polar bears, reindeer, ducks, ptarmigan and sea trout. The total and remarkable absence of all floe-ice accounted for the disappearance of the walrus, which is only found in the vicinity of floating ice.

Channel, is contracted to a width of half a mile and is impassable when a rough sea from the Atlantic meets a setting-out tide from the sound, a line of breakers forming from shore to shore. Within the sound the currents are moving among the islands in all directions and with great velocity, owing to the tide entering this body at both entrances. The islands rise abruptly from the water, are rounded off and show intact signs of former glacial action. Eider ducks (*Somateria mollissima*) were seen here in great numbers, among which was found one flock of the rare King Eider (*Somateria spectabilis*).*

The first view of Frobisher Bay itself disclosed the Everett chain of mountains on the further side of the bay, which at the entrance is thirty miles broad.

It appeared as a blue line of serrated peaks between which at remarkably regular intervals large glaciers forced their way to the water's edge. Ten of these were then visible, and the eye following them back into the interior could make out the faint white dome of the ice cap outlined against the southern sky.

The course was now changed to the northwest, following up the eastern coast. The land here rises to an almost uniform height of 500 feet. The aspect of the interior from this ridge is one of extreme desolation. The rock, almost void of vegetation, is broken up by frost action to such an extent as to effectually conceal the ledge underneath with a waste of sharp angular blocks piled one upon another. Here and there against hillsides having a northerly exposure were banks of snow which had withstood the summer's heat. This snow was, more properly speaking, of the consistency of ice, the alternate thawing and freezing during summers and winters having brought it to this state. It was not ascertained whether the banks were increasing or diminishing.

The bay along this coast for twenty miles is shallow, a falling tide and a westerly wind causing a dangerous undertow and huge waves which curl and break several miles from shore. Numerous reefs also tend to make this quarter a bad one during rough weather. This area of shoal water is called by the natives "Ickarto."

In latitude $62^{\circ} 45' N.$ the bay indents its eastern coast to a considerable extent, forming the historic body of water known as Countess of Warwick Sound. Here in 1861 Hall found several relics of the Frobisher Expedition of 1578.

* The identity of this bird was not known until after they had become unfit for preserving as specimens. The natives had removed and eaten the lumps of fat lying on either side of the upper bill where it joins the head.

According to the manuscript accounts of this hardy mariner and some of his officers, they had intended to build a house on one of the islands of the sound and establish a colony of one hundred men, who were to mine iron ore which had been found here the year before. As part of the house had been swept overboard on the outward voyage from England, the project had to be given up. Hall found the remains of a ship's trench and some of the "proofs,"—lumps of iron which had been made by the assayers of Frobisher's Expedition. The island is called "Kodlunarn" by the Eskimos, or "White Man's Island," there being still a tradition among them of a number of ships coming from the east manned by white men.

This sound is only separated from Cyrus W. Field's Bay by two miles of land, and a pass between the mountains at this point becomes a highway in winter for natives who visit the bay from the seaboard. A perfect raised beach, the only one seen in Frobisher Bay, was discovered on one of the mountains north of the sound. It was composed of large rounded boulders and pebbles, had an elevation of about two hundred feet and extended along the western slope of the mountain for a mile or more. Rounding the southern slope, an exact counterpart was discovered on the eastern side having the same elevation and kind of material.

Continuing up the coast, the land preserves the same general character as that found on entering the bay. The ridges near the coast remained at the usual height of 500 feet, but the view into the interior always presented the same appearance of rolling country, always rock, which rose as it receded until at the horizon the mountains might have an elevation of 1,000 feet.

The valleys always contained a stream of water taking its source from the patches of snow-ice. Vegetation thrived only at rare intervals where rock had disintegrated and formed soil, but in the larger valleys in the vicinity of water-courses, soft and spongy moss was always to be found. In these places, a species of stunted blueberry grows in considerable quantities, the berries being small and almost tasteless and maturing the last of September. Buttercups, primroses, daisies and yellow poppies were also seen in sheltered spots, forming bright bits of color which relieved the monotony of the landscape.

About half-way up the bay the first of a large number of islands which continue on up to the headwaters was reached and a circuitous course taken among them. These islands, composed of mica schist, the predominating rock of this region, contain many polished summits which bear unmistakable marks of glaciation. The general

direction of the striation found on the islands in the middle of the bay was parallel to the bay itself, viz. : northwest and southeast. Strong currents were again encountered among these islands, sometimes so strong that, notwithstanding a strong fair wind was blowing and all sail was set, the shore would have to be resorted to and camp pitched to await a turn of the tide.

Seals frequent the waters here in the winter when "water holes" are formed by the currents, making an opportunity for these animals to come to the surface to breathe. It is a favorite stamping-ground for the Eskimos in winter, who take up their abode here in order to be near the seals, from which they obtain their food, clothing and fuel.

As the headwaters of the bay are neared, the land to the east takes on a more undulating surface and rises to only a slight elevation: islands grow smaller and more numerous.

One night was spent on the end of Becher Peninsula (5th encampment) which divides the head of the bay into two large inlets. That to the east of Becher Peninsula, Hall has designated as Ward's Inlet, while the western body of water, being somewhat larger, he has considered the terminus of Frobisher Bay itself. Our course lay up this arm of the bay. Islands became mere reefs and ledges over which the tide at flood rushed with great violence.

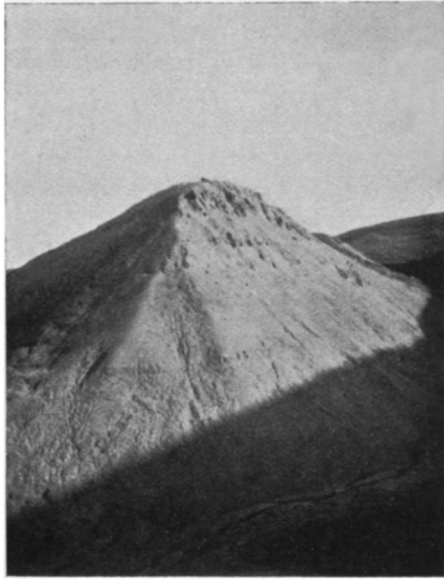
The Sylvia Grinnell River, of Hall, was found to be a stream of considerable importance as compared to other rivers of this locality. Its entrance to the bay was choked with small islands, tide water setting back some three miles to a beautiful falls, which at high water was about fifteen feet high. This river was not traversed beyond the falls, but it could be seen for several miles flowing from the northwest in sinuous curves through a low, almost undulating valley.

Twelve miles west of the Sylvia Grinnell River is a sister stream, the Jordan, which in its physical characteristics is a counterpart of the Grinnell. Its falls, divided by a small island, can only be reached with great difficulty at ebb tide, due to the great amount of tide water setting out into the bay over a wide, shallow, sandy bottom.*

*The two boats were five hours in making this distance, three miles. This trip against the morning tide seemed to be the only bit of bad judgment shown by the natives during the summer, but is partly explained from the fact that several of their tribesmen were encamped at the falls (their huts had been discovered through the telescope the day before), and they were anxious to meet their people, whom they had not seen since the winter previous. The boats went aground several times, and had it not turned into a veritable race for first place, for this our farthest north, the journey would have probably been given up until the afternoon.

The "Valley of the Jordan," if the size of its river is taken into account, must embrace a large watershed, probably extending well to the southwest towards Hudson's Straits. Its limit in the opposite direction is but a few miles from the river itself, as several long, narrow valleys discharging small streams into the bay were found lying between the two larger rivers. Moreover, the natives stated that Lake Amakdjuak, which drains north into Lake Nettilling and thence west into Fox Channel, was only distant "two sleeps." This expression "two sleeps" referred to journeys taken in summer by Eskimos heavily laden with their effects, and meant not more than thirty miles.

By far the most interesting feature of this valley was the Sillimans Fossil Mount of Hall. This is a limestone table-topped mountain, situated on the western side of the valley not far from tide-water, and lies close against the mountains of Meta Incognita. It forms a striking feature of the landscape, with its white sides silhouetted against the dark mica schist of the chain behind it; and when seen at a distance has the appearance of an immense sandbank extending out from the mountains. On reaching the base of the mountain the sides were found to be tali, which extended nearly to the top, and here the ledge cropped out in several places, making the plateau almost inaccessible except from the south, where it joins the ledge of the mountain side.



SILLIMANS FOSSIL MOUNT.

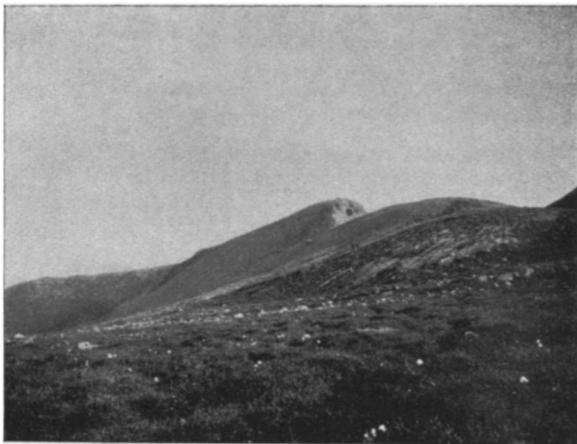
The view from the top is an extensive one. Jutting into the valley, as the mountain does, one commands an outlook down the bay and through the many islands until they dip to the horizon line.

Below you lies the valley through which the Jordan flows. As its course is traced northwards towards the interior, the Great

Gateway, so-called by Hall, outlines a northern sky and points the way to the great and unknown lake region.

Sillimans Fossil Mount is divided into two parts, brought about by the action of a small stream rising in the chain of hills to the west, and forcing its way out into the valley between the two high banks of crumbling limestone.

Fossils were collected* mostly from the bed of this brook and the slopes of the smaller mount.



THE FOSSIL MOUNTAIN (2D VIEW).

They were also found imbedded in the outcropping ledge at the summit of the larger mount, and a few were discovered on the table top

* The writer has received a communication relating to a part of these fossils from Prof. C. Schuchert, of the National Museum at Washington, D. C. It is given here. That part of the collection made by the writer is at the American Museum of Natural History, New York City.

DEAR MR. PORTER :

The fossils collected by Messrs. J. Nilson Carpender, A. Hollis White and Alfred V. Shaw, members of your Frobisher Bay party, at Sillimans Fossil Mount, are very interesting, historically and paleontologically.

As you know the Arctic explorer Charles Francis Hall describes in his "Arctic Researches and Life among the Esquimaux" the discovery of this locality and writes of the abundance of fossils occurring there. However it seems he brought back but six species from Sillimans Fossil Mount. These were studied by R. P. Stevens and his results published in the *American Journal of Science* for 1863. These fossils appear now to be lost.

In the three collections at hand there are seventy species indicating a varied and very well preserved fauna. Of corals there are 7 species, sponges 2, brachiopods 8, mollusca 46, trilobites 6 and cystids 1. You will therefore see that the work of your party added much material to elucidate the geologic history of Baffin Land.

The age of the Baffin Land fossils is Trenton, or the middle part of the Lower Silurian system, and find their nearest relatives in the Galena fauna of Iowa and Minnesota.

The same fauna is also found in Manitoba, but is not so abundantly represented by individuals and species.

Mr. E. M. Kindle, of the Sixth Peary Greenland Expedition, also obtained fos-

itself, which is covered with a thin layer of moss and strewn with granite boulders of glacial deposit. The height of this fossil formation is 340 feet above high water, instead of 100 feet as given by Hall.

It may be said before leaving this interesting locality that the



SILLIMAN MOUNT.

falls of the Jordan River contain quantities of sea trout,* which are secured by the natives with fish spears.

A native will take his position on the edge of the rocks, just below the falls, in swift water. With spear poised aloft, his eyes glued to the surface of the boiling stream, he awaits the clearing of the water of air bubbles so that he can see the bottom.

At such a time long parallel lines of gray, like the teeth of a comb, can be seen slowly moving forwards and backward, and he

sils known to occur at Sillimans Fossil Mount from a Missionary "who obtained them from the shore of Lake Kennedy, which lies northwest of the head of Cumberland Sound." You told me of another fossiliferous locality more inland, from Sillimans Fossil Mount, and with the known occurrence of Trenton fossils in Ottawa, Quebec, New York, Illinois, Wisconsin, Minnesota and Manitoba, it is highly probable that there was an almost circumferential deposition of Trenton strata around the nucleus of North America, the Laurentian and Huron rocks of Canada and New York.

CHARLES SCHUCHERT.

U. S. NATIONAL MUSEUM, January 31, 1898.

* It was commonly supposed by those who have visited Baffin Land heretofore that these fish were salmon trout, and it was not until a large specimen had been speared in the vicinity of Signuia Point, and others taken in various parts of the bay, that the fact became known that it was the sea trout and not the salmon (found in Greenland and Labrador) which run up these rivers to spawn.

drives the spear into the midst of them. If he captures one fish in fifty throws he considers himself fortunate, but it is a virtue of the Eskimos to be patient, and it is a rare occurrence if he does not return to camp with at least one of these beautiful fish, which average in weight from five to ten pounds.

Constant spearing often scares the trout out of throwing distance, in which case boys are stationed above and below the spearsman, throwing rocks into the river, thus keeping the school continually moving.

Five families of Innuits had, two days before our arrival, left for the interior to the northwest after cariboo (*Rangifer tarandus*). They had taken their entire equipment with them—guns, ammunition, tents, dogs, children—in fact, everything they possessed except their kayaks. These were left at the falls, inverted and resting on piles of stones. Their destination was the southwest shore of Lake Amakdjuak, where game was most plentiful at this season of the year. Although there were countless signs of cariboo in the vicinity of the Jordan River, the presence of the natives had driven them all away from the seaboard.

At 6 o'clock Thursday morning, August 26, the return journey was commenced, setting a course down the coast of Meta Incognita, on the western side of the bay. Taking advantage of the falling tide, the boats passed out of the Jordan River and over the shoals, where Hall in 1861 experienced a "struggle for dear life."

He describes the place as "boiling and seething mill-races, made by the tide as it rushed along." The sound was like the "roar of the sea raging in a storm." Undoubtedly it is a bad place at low tide, but not at all dangerous when traversed at high water. We saw nothing resembling such conditions as these words painted then, probably because it was nearly high tide.

At 10 A.M. we came in between Bishop's Island and the mainland, and found the water so shoal as to require a stop and await the turning tide before going on to the camping place picked out by the natives. This did not occur until well into the afternoon, allowing plenty of time to ascend to the summit of the ridge and obtain a view of the interior. At an elevation of about 1,000 feet one could look westwards into a valley whose bottom lands were so extensive as to remind one of the Connecticut River Valley between Vermont and New Hampshire. Its two rivers also, uniting into one some three miles from its mouth, had the same banks and about the same breadth as the river cited above. Vegetation appeared to be more abundant here than at any other place as yet

seen during the summer. This stream debouches into the Bay of Rivers.

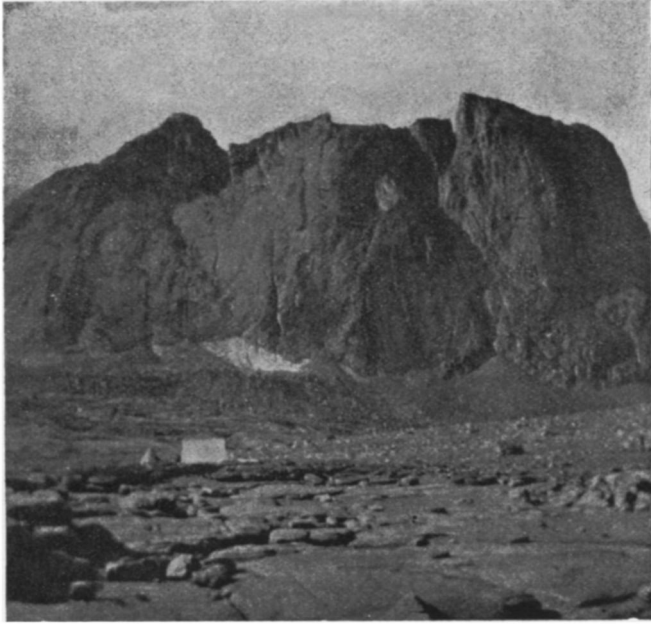
At the second camp down the coast from the Bay of Rivers an incident occurred which, although insignificant in itself, led to a good deal of the unknown country to the west being thoroughly explored. This was due to two members of the party who had left the boats in the morning, intending to hunt down the coast, and failed to turn up at the camp when night came on. Signal shots were fired through the night and a beacon fire built on the summit of a neighboring ridge. With the dawn, and no signs of the absent ones, the remainder of the party and the entire force of Eskimos scattered up and down the coast and up the passes into the interior. The men were picked up three miles down the coast, but when the party were all congregated at the tent there were many interesting accounts of the country gone over. One member had viewed from a ridge 1,100 feet high a broad valley with its river and sand banks, the river larger even than the one at Bay of Rivers, full of rapids and flowing southeast. Two gaunt, dirty yellow wolves (*Canis occidentalis*, var. *griseo-alba*) were trotting down the shore of this stream, continually stopping and scenting the air in the direction they had come from, as though they had seen others of the party to the north. Another member had visited two lakes, due west of the camp (which probably drained into the river already mentioned), and into which plunged a waterfall of quite imposing dimensions.

That night it was announced to the natives that we intended going down the coast to the glaciers before crossing to the east side of the bay. Their evident disapproval of such a step was quite apparent, as they explained that no Eskimos ever visited that part of the coast, especially in the summer. Moreover, such a trip would necessitate a long stretch for the boats across the bay, without the friendly shelter of islands in which to seek a harbor should a change of weather require it.

However, the opportunity of seeing so much virgin land was too good to be lost, and for the first and only time on the trip were the Eskimos' objections set aside.*

* No mishaps occurred on this section of the trip. The natives evidently thought we were going farther down the coast. As it was, only the northernmost of the glaciers on Meta Incognita was visited, and a course steered across the bay curving to the northwards and passing near the end of Gabriel Island. This curving to the northwards was almost a semi-circle, described by the boats as they beat up into the wind. It serves to show the caution of the natives. Had the course been straight across to the islands and the wind increased, there would have been danger of being blown out into the bay.

With two stops the coast was traversed from Cape Ramelsburg to Watts Bay, a distance of seventy-six miles. The coastal range presented one unbroken line of jagged peaks, having an average elevation of 2,000 feet. With remarkable regularity narrow valleys



EVERETT MOUNTAINS.

ran from the shore towards the interior, hemmed in by cliffs which rose from their tali sheer to the summits. These summits, that is, all the highest ones, were cut squarely off, and at a distance had the appearance of sharp truncated cones. It was very noticeable how easily their table-tops would adapt themselves to a smooth, flowing horizon line if one imagined the gaps between them to be filled up. It seems rational to assume that this range of mountains was covered at one time with an ice-cap of some size, and that, after its retreat, powerful disintegrating forces had been at work cutting out the valleys. The general strike of the rock (gneiss) for the most part was nearly vertical, the mountain sides being crossed in several places by large dykes.

The 13th encampment was at the head of a bay whose existence seems to be entirely ignored on Hall's chart. In fact, the coast of Meta Incognita appears to be quite inaccurately drawn on the chart accompanying Hall's "Arctic Researches." It is not to be won-

dered at, however, as he saw a greater part of it from a distance, and that, too, in the winter, when the snow covered both ice and land. Newell Sound is not so large as represented, and two bays indent the coast north of Griffin Bay and south of the one at which we camped.

This bay (13th encampment) is five miles long, with a uniform width of two miles. At its head there is a small lake, about one mile long, which at high tide becomes part of the bay, and therefore slightly brackish.* The latitude of this bay, by meridian altitude, was found to be $62^{\circ} 48' N$.



BOAS GLACIER.

Thursday evening, Sept. 4th, the boats entered Watt's Bay (14th encampment), and the tents were pitched on its northern shore, where large circles of stones gave evidence of winter Eskimo encampments. Across the bay, two miles to the southwest, was the blue wall of a glacier, hemmed in on either side by high mountains. On the horizon, back of it, a luminous glare from the ice-cap lit up the fog and mist which was shutting down over the landscape.

The next day, although fog and occasional rain made climbing disagreeable, the glacier was ascended. One mile to the right of

* The Eskimos said there were very large fish in this lake. One native was nearly pulled in by something which had got hold of the other end of his line, only giving up the struggle when the line broke. This was even repeated a second time, and the fish seen, three or four feet long. A few smaller ones were caught and proved to be northern cod.

its face a beautiful waterfall emptied into the bay. From an elevation of 300 feet above high-water this glacial stream slid over the smooth rock in a convex elliptical curve, which at the water's edge was nearly vertical.



FACE OF BOAS GLACIER.

The face of the Boas Glacier* is approximately 150 feet high, and has a frontage of some one hundred yards. The glacier was not discharging to any noticeable extent, there being no bergs in Watts Bay.†

In the centre of the ice stream, and perhaps half a mile from its face, the writer set up a signal pole of bamboo, marking the spot additionally with a pile of rocks. Then cairns were erected on the shore in line with the pole, and sketches of the surrounding locality made for the purpose of identifying the spot in winter.‡

* Named by the writer in honor of Dr. Franz Boas, of the American Museum of Natural History, New York City.

† The larger glaciers of Meta Incognita probably discharge during the summer, as several large bergs were seen on the other side on our way up the bay. These might, however, have possibly found their way into Frobisher Bay from the Labrador Current.

‡ It was the writer's intention to revisit the glacier in the summer of 1898 to ascertain how far down stream the pole had moved, and in this way get at an approximate rate of flow of the glacier. Circumstances compelling his return to the States left this work scarcely begun, which is to be regretted inasmuch as no one has as yet visited the Meta Incognita glaciers to study their movement.

The Boas Glacier is an easy one to travel on. It has an angle of descent of 15° with the horizon, and on its southern side one can walk directly to the ice-cap above. It can be crossed at almost any point. Its surface is clean and hard, carrying but little detritus, and in September was melting and furrowed by many streams of water. The so-called "pot holes," found in numbers on the Greenland glaciers, were conspicuous by their almost total absence.

At a distance of two miles from the face of the glacier the consistency of its ice changes to that of snow, and half a mile farther on the ice has entirely disappeared as well as the crevasses. The horizon to the west was obscured by fog, but the appearance of the ice-cap at this place was that of rolling plains of snow through which a single nunatak forced itself.

The writer, accompanied by Mr. Shaw, reached this "island of the white sea" after floundering through wet snow knee-deep, and succeeded in reaching its summit, where a cairn was built and a record deposited. It had an elevation above the bay (by aneroid) of 2,380 feet.

The return to Signuia Point, from Watts Bay, was without special interest, as the course was for the most part over familiar ground. The party were stormbound two days in Bear Sound, having made two ineffectual attempts to pass through Lupton Channel, where a line of breakers, due to the setting of the tide against a heavy swell from the Atlantic, checked further progress.

The *Hope* was reached at 5 P.M. of Sept. 12th, and early the next morning she started south, reaching Sydney, Cape Breton, eight days later.